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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/799,486

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Timothy Graham Bradley

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EXAMINER

UHLLENHAKE, JASON S

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/799,486	<b>Applicant(s)</b> BRADLEY, TIMOTHY GRAHAM	
	<b>Examiner</b> JASON S. UHLENHAK	<b>Art Unit</b> 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 8-20 and 23-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-20 and 23-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/8/2008 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 8-11, 13, 17, 20-25, 27, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) in view of Kimura (U.S. Pub. 2002/0126167)

#### ***Gundlach discloses:***

- ***regarding claim 1***, an apparatus for electrorheological printing, the apparatus comprising: an electrode arrangement configured to create an electric field to control a rate of discharge of the electrorheological ink through the nozzle, wherein the

Art Unit: 2853

electrode arrangement is further configured to create an electric field with a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and configured to create an electric field with lower magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

- **regarding claim 5**, the electrode arrangement comprises one or more electrodes circumscribing a portion of the nozzle (Figure 2; Column 4, Lines 30-32)

- **regarding claim 8**, a plurality of nozzles forming a nozzle array and the electrode arrangement is one of a plurality of electrode arrangements, each electrode arrangement disposed to control a flow of the electrorheological ink at one of the plurality of nozzles (Column 3, Lines 59-65; Column 4, Lines 30-32)

- **regarding claim 9**, the flow of the electrorheological ink at each nozzle of the nozzle array is independently controlled (Column 3, Lines 59-65; Column 4, Lines 30-32)

- **regarding claim 10**, a print control module configured to receive a print signal; a synchronization signal module configured to control the synchronization signal generated by the stimulator; an electrode control module configured to synchronize a voltage level at the electrode arrangement with the synchronization signal and the print signal (Figures 2-3; Abstract; Column 5, Lines 24-40)

- **regarding claims 11, 24**, control module configured to de-energize the electrode arrangement about when the synchronization signal and the print signal are enabled (Column 5, Lines 24-40)

- **regarding claim 13**, a viscosity control module configured to control the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 5, Lines 24-40)
- **regarding claim 17**, computer readable storage medium comprising computer readable code configured to carry out a method for electrorheological printing, comprising; creating an electric field in an electrode arrangement to control a rate of discharge of the electrorheological ink through the nozzle, wherein the electrode arrangement is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)
- **regarding claim 20**, wherein controlling the flow of the electrorheological ink at the nozzle comprises changing the viscosity of the electrorheological ink (Column 5, Lines 24-40)
- **regarding claim 23**, discharging a drop of the electrorheological ink from the nozzle (Column 3, Lines 59-65)
- **regarding claim 25**, method further comprises receiving a print signal (Abstract; Column 3, Lines 30-40)
- **regarding claim 27**, controlling the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 5, Lines 24-40)
- **regarding claim 29**, a method for electrorheological printing, comprising; creating an electric field in an electrode arrangement to control a rate of discharge of

Art Unit: 2853

the electrorheological ink through the nozzle, wherein the electrode arrangement is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

- **regarding claim 30**, an apparatus for electrorheological printing, comprising; means for creating an electric field in an electrode arrangement to control a rate of discharge of the electrorheological ink through the nozzle, wherein the electrode arrangement is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to permit electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

***Gundlach does not disclose expressly the following:***

- **regarding claims 1, 17, 29-30**, a pressurized ink chamber configured to contain ink, the pressurized ink chamber in fluid communication with a nozzle; a stimulator configured to generate a synchronization signal to increase the pressure in the pressurized ink chamber, wherein the increased pressure within the pressurized ink chamber caused the electrorheological ink to discharge through the nozzle

***Kimura discloses:***

- **regarding claims 1, 17, 29-30**, a pressurized ink chamber configured to contain ink, the pressurized ink chamber in fluid communication with a nozzle; a stimulator configured to generate a synchronization signal to increase the pressure in

the pressurized ink chamber, wherein the increased pressure within the pressurized ink chamber caused the ink to discharge through the nozzle (Abstract; Paragraphs 0004, 0038)

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to synchronize the synchronization signal and the print signal to de-energize and modify the voltage level of the electrode arrangement by an electrode control module and incorporate the teaching of Kimura into the device of Gundlach, for the purpose of driving an ink jet type recording head, which can obtain a sufficient ink droplet discharge velocity.

Claims 2-3, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) as applied to claim 1 above, and further in view of Darty (U.S. Pat. 6,312,110)

***Gundlach as modified by Kimura discloses:***

- ***regarding claim 15***, a nozzle configured to discharge a drop of ink wherein the ink is under pressure within each nozzle (Kimura: Paragraphs 0004, 0038); an ink having an electrorheological composition, the ink configured to change viscosity in response to an electric field, and wherein the electrode arrangement is further configured to create an electric field with a magnitude sufficient to stop the discharge of the electrorheological ink through the nozzle and to create an electric field having a lesser magnitude to allow electrorheological ink to discharge through the nozzle (Figures 2-3; Abstract; Column 5, Lines 24-40)

***Gundlach as modified by Kimura does not disclose expressly the following:***

- ***regarding claim 2***, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode
- ***regarding claim 3***, the first ring electrode is connected to a first electrical lead and the second ring electrode is connected to a second electrical lead
- ***regarding claim 15***, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle

***Darty discloses:***

- ***regarding claim 2***, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64), for the purpose of utilizing a high resolution print head
- ***regarding claim 3***, the first ring electrode is connected to a first electrical lead and the second ring electrode is connected to a second electrical lead (Darty: Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64)
- ***regarding claim 15***, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64; Column 7, Lines 9-17), for the purpose of utilizing a high resolution print head

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode



as taught by Darty into the device of Gundlach as modified by Kimura, for the purpose of utilizing a high resolution print head

Claims 4,16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Darty (U.S. Pat. 6,312,110) as applied to claim 1 above, and further in view of Takahashi (U.S. Pat. 6,695,439)

***Gundlach as modified by Kimura and Darty discloses:***

- ***regarding claim 16***, a nozzle array defining a plurality of nozzles, each nozzle defining a nozzle volume configured to contain an ink particle wherein the electroheological ink is under pressure within each nozzle volume (Kimura: Paragraphs 0004, 0038); wherein the electrode pair is further configured to create an electric field having a magnitude sufficient to stop the discharge of the electrorheological ink through said each nozzle volume and to create an electric field having a lesser magnitude to permit ink to discharge through said each nozzle volume (Gundlach: Figures 2-3; Abstract; Column 5, Lines 24-40)

- ***further regarding claim 16***, a plurality of ring electrodes forming a plurality of ring electrode pairs, each of the plurality of ring electrodes circumscribing one of the plurality of nozzles and each ring electrode pair corresponding to one of the plurality of nozzles; wherein the electric field controls a rate of discharge of the electrorheological ink particle through each nozzle volume (Darty: Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64; Column 4; Lines 1-5; Column 7, Lines 9-17)

***Gundlach as modified by Kimura and Darty discloses all the claimed limitations above except for the following:***

- ***regarding claim 4***, the first electrical lead is connected to a reference voltage and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage
- ***regarding claim 16***, a power supply connected via at least one electrical lead to one of each of the plurality of ring electrodes in each ring electrode pair, the power supply configured to supply power to the connected ring electrodes, thereby creating an electric field in each nozzle volume at each electrode ring pair

***Takahashi discloses:***

- ***regarding claim 4***, the first electrical lead is connected to a reference voltage (ground) and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes
- ***regarding claim 16***, a power supply connected via at least one electrical lead to one of each of the plurality of electrodes in each electrode pair, the power supply configured to supply power to the connected electrodes, thereby creating an electric field in each nozzle volume at each electrode ring pair (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Takahashi into the device of Gundlach as modified by Kimura and Darty, for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

Claims 12, 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) as applied to claims 1 and 17 above, and further in view of Howkins et al (U.S. Pat. 6,932,458)

***Gundlach as modified by Kimura discloses all of the claimed limitations except for the following:***

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber

***Howkins discloses:***

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber (Column 6, Lines 27-67)

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Howkins into the device Gundlach as modified by Kimura, for the purpose of improving the performance of ink jet print heads in high frequency usage conditions

Claims 14, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) as applied to claims 1 and 17 above, and further in view of Mutou (U.S. Pat. 5,227,814)

***Gundlach as modified by Kimura discloses all of the claimed limitations except for the following:***

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed

***Mutou discloses:***

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed (Column 5, Lines 30 – 48), for the purpose of shortening recording time.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Mutou into the device of Gundlach as modified by Kimura, for the purpose of shortening recording time.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) as applied to claim 17 above, and further in view of Minemoto et al (U.S. Pat. 6,224,193)

***Gundlach as modified by Kimura does not disclose expressly the following:***

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode

***Minemoto et al discloses:***

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode (Column 4, Lines 19-33),

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Minemoto et al into the device of Gundlach as modified by Kimura, for the purpose of ejecting from an ejection electrode with reliability and stability.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gundlach et al (U.S. Pat. 6,048,050) as modified by Kimura (U.S. Pub. 2002/0126167) and Minemoto et al (U.S. Pat. 6,224,193) as applied to claim 17 above, and further in view of Darty (U.S. Pat. 6,312,110)

***Gundlach as modified by Kimura and Minemoto does not disclose expressly the following:***

- ***regarding claim 19***, wherein the first and second electrodes are ring electrodes, each ring electrode circumscribing a portion of the nozzle

***Darty discloses:***

- **regarding claim 19**, wherein the first and second electrodes are ring electrodes, each ring electrode circumscribing a portion of the nozzle (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64), for the purpose of utilizing a high resolution print head.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Darty into the device of Gundlach as modified by Kimura and Minemoto, for the purpose of utilizing a high resolution print head.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection. Please see the above rejection regarding Gundlach et al (U.S. Pat. 6,048,050) in view of Kimura (U.S. Pub. 2002/0126167).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON S. UHLENHAKKE whose telephone number is (571)272-5916. The examiner can normally be reached on Monday-Friday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2853

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JASON S UHLENHAKE/  
Examiner, Art Unit 2853  
April 15, 2008

/Julian D. Huffman/  
Primary Examiner, Art Unit 2853